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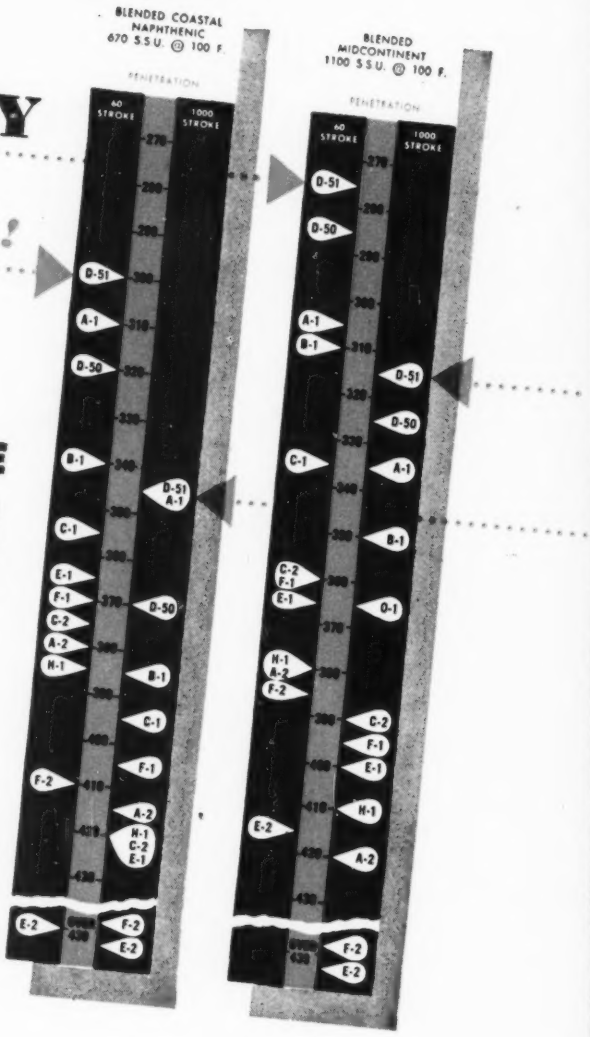

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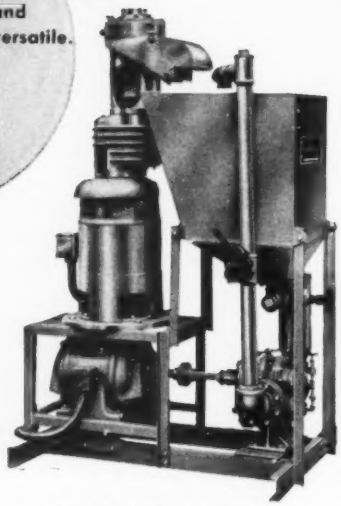

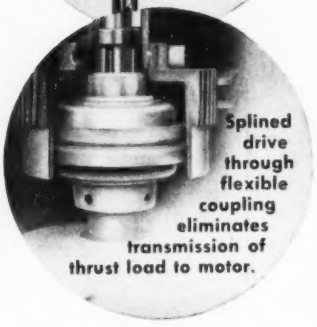

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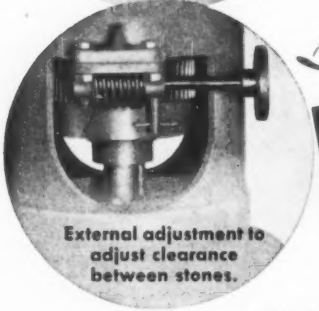

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ABOUT THE COVER

The Wood River Junction, Rhode Island plant of the Warwick Chemical Company, Division of the Sun Chemical Corporation is the principal location for the manufacture of Warwick's stearates. Two complete units are included—a continuous flash drying unit and a conventional truck and tray unit. This combination enables Warwick to produce tailor-made stearates. In the production of stearates, the sodium soap of a particular fat mixture is made first. This is then precipitated with the heavy metal salt such as aluminum, zinc, etc., in slurry tanks. The slurry is then de-watered to the greatest possible extent by filter presses, centrifuges or other mechanical equipment.

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LUBRICATE FOR SAFETY - EVERY 1,000 MILES -

President's page

by Howard Cooper, President, N.L.G.I.

STANDARDS IN BUSINESS

These lines were suggested by a recent Sunday morning sermon which dwelt on the theme of standards which have guided our living and human relations through generations. The questions were posed, "Are these standards on the way out?" and "How do we now gauge morals?" An examination leads to the conclusion that long established standards are still fundamental in the principles which guide our lives today.

The sermon prompted thoughts about morals in business. There are some who are eternally suspicious of those engaged in business, i.e., the manufacturer and supplier, and particularly corporations that have expanded to enormous size. These persons harbor a conviction that the operator of any business, from the formidable large corporation down to the one man storekeeper, possesses and exercises a power to mulct the defenseless purchaser. Perhaps there may be some such business operators, but generally speaking, "It ain't necessarily so."

The minds which persist in holding such conception fail to recognize the leveling influence of competition. But more than that they ignore the fact that the people who operate businesses are by and large God fearing persons, such as these skeptics consider themselves to be. Business men and business executives were trained in childhood just as they were, to recognize that honesty and fairness are basic principles of good character; this training even haunts those who may be tempted to forget their upbringing. There is also pride in accomplishment—in the making of something better than has been made before. Further, there is the striving for favorable acceptance and recognition. These are factors which help to keep business on a moral plane.

To be sure there can be more intimacy of contact between the customer and the top man in a small business; he is more easily reached, and decisions may be more quickly made. This leaves an impression of mutual personal understanding. In contrast, an expanded corporation with multiple departments delegated to perform specific phases of business operation, seems cold. Necessarily decisions may not be reached as quickly, because several departments with separate responsibilities may be involved. Yet this does not mean that a customer is not accorded a sincere consideration, which he may feel he receives in greater measure from a small businessman. After all, the men in large corporations are the same sort of humans as those engaged in business on a smaller scale. They have the same moral obligations to their business, their partners, their stockholders, their employees and to their customers.

With respect to customer relations, morality in business, large or small, means much more than guaranteeing to the purchaser the correct change when a sale is made. It embraces interest in the customer's needs, and an endeavor to helpfully serve those needs. It includes the intent to make products of the highest quality within the manufacturer's capability, and to price its products at levels consistent with the quality. Morality in business is expressed in sympathetic understanding, honest endeavor and constructive service.

In the over-all, when carefully scrutinized, business men whether they be the corner shopkeepers or the executives of nationally or internationally expanded corporations, will be found to be operating according to a code of ethics which is founded on the standards of honesty and fairness that have been the established code of many generations. Living up to such standards is essential to sustained success.

Thus it can be concluded that, with exceptions which it must be recognized will exist in any large activity of vast scope, business in general, both large and small, is morally sound, because in overwhelming preponderance it is conducted by citizens who are sound morally.

Graphite AS A LUBRICANT

THE first use of graphite as a lubricant is lost in antiquity. The name "graphite" was first given to the mineral by the mineralogist Werner in 1789. It is well, however, to mention that graphite (and unless otherwise stated, references apply only to the natural mineral form) is of the carbon family. It is also known under other names such as blacklead, silver lead and plumbago. These names are still frequently used, particularly in the foundry trade. The grades used for foundry work are in most cases of lower quality and blended with binding agents.

Graphite, one of the softest minerals, has a hardness of ½-1½ on Moh's scale. Diamond, also of the carbon family, has a hardness of 10 on the same scale.

Graphite is now being used throughout industry for a multitude of purposes. It is unctuous, a feature which often results in the reference "greasy" to be applied to graphite, although it is free from oil or grease in its original form.

Graphite marks readily, burns slowly and is almost chemically inert. It is a good conductor of heat and electricity, has excellent weathering properties and mixes readily and homogeneously when combined with oils or greases. It has a specific gravity of 2.1-2.5.

There are three distinct forms of natural graphite: flake, vein and so called amorphous.

Flake graphite is usually found disseminated in schist and the ore, as mined, yields only a few per cent which is suitable for use in industry. An outstanding example of flake graphite is that obtained from Madagascar. Flake graphite is, of course, found in many other locations, but Madagascar is our most dependable source of supply. Flake graphite from this source is preferred for use in the manufacture of crucibles. Packing manufacturers also prefer this grade for use as a lubricant in many of their products.

Vein graphite, another form, is best represented by the grades imported from Ceylon. Graphite from Ceylon is usually imported in lump form, although grades known as chip and dust are also imported. Ceylon graphite is found to vary in structure and is classified as carbon, crystalline, crucible, and needle lump.

The third form of graphite is referred to as amorphous because of its earthy appearance. Extensive deposits in Mexico and Korea have been our principal sources of supply. This type does not appear to the eye to have a crystal structure. Under the microscope, however, crystals can be detected and this accounts for the term "cryptocrystalline" being applied to amorphous graphite.

Graphite varies not only in structure, but in purity as well. The kind of associated mineral is as important as the purity. Flake graphite of 85-87 per cent graphitic carbon is used in manufacture of crucibles and retorts. For use in lubricants, packings and similar products, the higher carbon grades are preferred.

Graphite from Ceylon is usually imported as 90-95 or 97-98 per cent lump. Ceylon chip and dusts ranging from 55 to 90 per cent are also imported. Amorphous graphites usually run from 80 to 85 per cent graphitic carbon.

It would probably be of interest to mention some of the uses for graphite other than lubrication. Pencils, which everyone uses at some time or other, are referred to as lead pencils. The "lead" in pencils is a combination of graphite and binders. All three forms of graphite are and have been used in the production of pencils.

In crucibles, retorts, stopper heads and similar refractory products, graphite gives the product the following properties: (1) high thermal conductivity, (2) high electrical conductivity, (3) low thermal expansion, (4) high refractoriness, (5) high resistance to metal and flux attack, and (6) thermal plastic properties at elevated temperatures.

Manufacturers of motor and generator brushes use graphite in many of their products since it has useful electrical properties and is self lubricating. In dry cells graphite is mixed with manganese dioxide to produce a conductive mixture. In

The continued use of graphite in lubrication after more than one hundred years surely indicates that benefits are derived from its use.

E. S. Glauch, Joseph Dixon Crucible Co.

paint graphite is used as a pigment and also as a protecting medium. Many other uses include resistors, coatings for cathode ray tubes, power glazing and pelleting, as a carbon raiser in steel manufacture, in production of parts by powder metallurgy (steel and nonferrous), coating roofing granules, brake linings, gaskets, stove polish and other special products.

QUALITY OF GRAPHITE TO BE USED IN LUBRICANTS

That the quality of the graphite used has an effect on its efficiency can readily be assumed. The nature of the associated minerals has a definite relation to the value of the graphite.

TABLE I
Relative Loss in Weight on Block

Graphite type	Graphitic carbon %	Speed, rpm	Load, psi	Avg loss in weight, mg	Particle size through 325 mesh, %
Amorphous	40	800	829	8.70	75
Amorphous	69	800	866	8.55	65
Amorphous	85	800	1009	7.65	85
Flake	85	800	1014	3.70	95
Flake	99	800	1214	2.60	94
Crystalline	98.5	800	1263	2.50	99
Artificial	95.5	800	639	19.85	100
Oil only		800	935	4.55	

Viscosity of oil	315′ @ 100 F
Pour test	−15 F
Open flash point	370 F
Gravity	23.5 Baume

The mere fact that one graphite has lower ash content than another does not necessarily indicate that same is better for lubrication purposes. Tests indicate, generally, that with natural graphites, the lower the percentage of impurity the lower the loss in bearing weight.

Table I shows results of tests conducted on the Timken lubricant tester. The object of this series of tests was to endeavor to determine possible wear on bearing and its relation to purity and type of graphite.

Standard Timken rings and steel blocks were used on all tests. Bronze blocks, machined to fit rings, were first tried, but it appeared difficult to get proper alignment. Tests were therefore made with steel blocks.

The loads shown on chart were determined after completion of test by measuring width of scar. The initial load was in all cases (according to Timken Chart) 2500 psi.

Tests indicate that wear, with natural graphites, bears a definite relation to percentage and type of impurity in the graphite.

Kent, 9th edition states: "Graphite in a condition of

TABLE II

Per Cent graphite by weight	Average speed, rpm	Temperature rise per hr, per degree F	Co-efficient of friction
0	120.1	26	0.00284
1.7	129.8	35	0.00268
2.1	125.3	20	0.00253
3.1	130.9	30	0.00269
3.9	127.0	28	0.00215
5.6	127.7	36	0.00235
6.9	130.1	32	0.00261
8.5	128.3	36	0.00421

powder and used as a 'solid lubricant,' so called to distinguish it from liquid lubricant has been found to do well where the latter failed." Rennie in 1829 says, "Graphite lessened friction in all cases where it was used." General Morin, at a later date, concluded from experiments that it could be used with advantage under heavy pressures; and Prof Thurston found it well adapted for use under both light and heavy pressures when mixed with certain oils. It is especially valuable to prevent abrasion and cutting under heavy loads at low velocities.

Prof W. F. M. Goss, of Purdue, in a series of tests in 1901, obtained results with various mixtures of sperm oil and graphite, which indicated a reduction in the co-efficient of friction when using graphite. The pressure on the bearing was approximately 200 psi projected area. The test was conducted at a speed of 120 to 130 rpm. Table II shows figures taken from the Goss report.

From these figures it can be concluded that for a bearing operating at pressures in the range of 200 psi, a lubricant containing 4 per cent of graphite is more efficient than the liquid lubricant alone, or mixtures containing either a lesser or greater percentage of graphite.

At a later date, Prof. Goss conducted a series of tests on a ball thrust bearing operating at 475 rpm. In this series of tests, he used kerosene, lard oil and vaseline to which had been added 4 per cent of finely pulverized graphite. Curves showing results are shown in Figures 1, 2 and 3.

As the result of these tests Prof Goss says that the following general conclusions may be drawn:

"A combination of graphite and lard oil makes up a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard oil alone will do and which, at the same time will give a lower frictional resistance of the bearing and permit a large increase in the load which it may be made to carry. An oil as light as kerosene, when intermixed with graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure.

"Even so viscous a lubricant as vaseline will better perform a given service in the lubrication of ball bearings when supplemented by small amounts of graphite. The bearing to which the mixture is applied will work with less frictional resistance and will carry a heavier load than when vaseline alone is used."

The above references are presented primarily to indicate that graphite has been used in the field of lubrication for many years.

The continued use of graphite in lubrication after more than one hundred years surely indicates that benefits are derived from its use.

Bearings and journals that appear to be perfectly smooth to the eye will under magnification, appear as a series of grooves, sometimes quite irregular. In a 360 degree bearing, operating under light loads, a fluid lubricant will serve to pre-

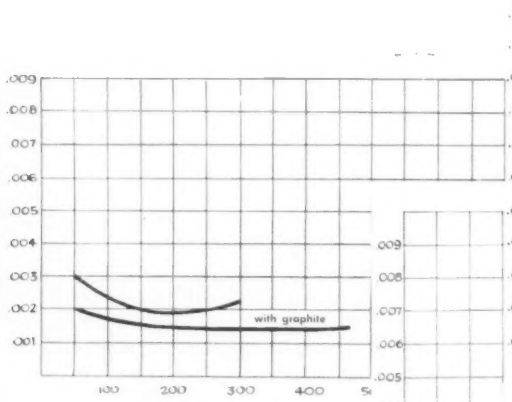

Figure 1

Curve shows test results which gave coefficient of friction for kerosene with or without graphite with the shaft running at 475 rpm.

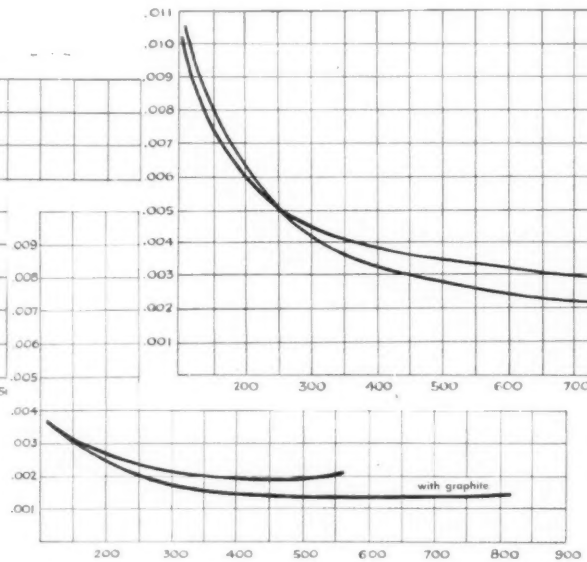

Figure 2

Figure 2—Curve shows test results which give coefficient of friction for lard oil with or without graphite with the shaft running at 475 rpm.

Figure 3

Figure 3—Curve shows test results which give coefficient of friction for vaseline with or without graphite with the shaft running at 475 rpm.

vent metal to metal contact. As pressures increase and in bearings of less than 360 degrees, the oil film is ruptured. For that reason, greases must be used. In some cases, to maintain the film, the lubricant is so viscous as to cause a drag, which results in high power consumption.

Some years ago the writer presented figures, before the Chicago Section of the AISE, which clearly indicated that graphite lubricants reduced, under actual operating conditions, power consumption up to 25 per cent, with no other change in operation other than the lubricant. (See Iron and Steel Engineer, May 1931).

In the mill tests, conducted by the writer, he noted the difference in the lubricant film on the roll necks. Many of the non-graphite greases produced a rather thick film. The graphite grease film, was much thinner and after a short period of operation the neck had a gun metal color.

On one test the roller reported the necks were getting bright, they having been told that bright necks meant lack of lubricant and would result in a hot neck. Checking it was found the neck had acquired a graphite film and was operating at normal temperature. The graphic wattmeter indicated a considerable reduction in power consumption. This mill is still lubricated with graphite grease and has been for over twenty years. Many other mills where similar tests were conducted over twenty years ago are still being lubricated with graphite grease.

Graphite, due to its ability to fill in the low spots on both journal and bearing, has enabled operators to keep equipment operating which otherwise would have to be shut down for overhaul.

Graphite will lubricate bearings operating at temperatures which will carbonize oils and greases.

Tunnel kilns, annealing furnaces, continuous core ovens and similar units can be and are being lubricated with graphite. Since it is sometimes difficult to apply dry graphite to bearing surfaces, a vehicle or carrier is used which will vaporize without leaving carbon residue. Graphite in paste and rod form is supplied to users and manufacturers of bearings which must operate without oil or grease. Solid graphite bearings are used where excessive heat or other operating conditions prevent use of oil or grease.

Graphite lubricants are used in extrusion of various metals, in die forging, in wire drawing, and shell nosing.

Many steel plants operate railroad equipment, therefore it would be well to mention some uses for a graphite product, used for lubrication, which is neither an oil or grease. This product, supplied in paste form, is diluted by the user with a thinner which can be turpentine, paint and varnish makers' naphtha, carbon tetrachloride or similar material.

The surface on which this product is to be applied should be free from oil or grease so the film will dry hard. After drying, a graphite film provides dry lubrication and does not collect and hold dust and dirt which frequently is the case with non-drying oils or greases.

This product is being used on center castings, diaphragms, buffer assemblies and pedestal jaw liners on cars. It is also used on center castings, pedestal jaws and other parts of diesel locomotives where sliding friction occurs.

Many railroads are now using this product for lubrication of switch plates. In this service, the dry coating reduces the cost of lubrication, since it does not require frequent renewal, as is the case with black oil which has been used for many years. Some railroads have reported reductions up to fifty per cent.

In conclusion, the following summarizes the properties of graphite:

1. Graphite is a solid lubricant.
2. All grades are not recommended for use in lubrication.
3. Graphite mixes readily with oils and greases.
4. Graphite does not chemically react with other materials.
5. A metal surface that has been coated with graphite is more readily wet with oil or grease.
6. Graphite will withstand pressures and temperatures which are beyond the range of oils and greases.
7. Graphite lubricants will, in most cases, reduce power consumption and maintenance costs.

Discussion of *Graphite* AS A LUBRICANT

Presented By

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John F. Boal, Lubrication Engineer, Carnegie-Illinois Steel Corp., Homestead, Pa.*

V. A. Crosby, Climax Molybdenum Co., Detroit, Mich.

***At time of presentation of paper.**

C. E. Pritchard: I am well aware of the benefits derived from the usage of graphite for bearing surfaces where you have surface defects that can be made up into a virtually smooth surface by such additions. Likewise, by virtue of our own field experience, we have had certain ramifications in the usage of graphite that still puzzle us, and I would like to project a question to Mr. Glauch. What is the optimum percentage and type of graphite that can be utilized in an antifriction type bearing? We have found that graphite deposits will become accumulative in the bearing by subsequent

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additions of a given lubricant employing graphite as a filler. How can you account for the relatively high rate of wear experienced in the usage of conventional graphite type greases in antifriction bearings?

The experience offered, by our personal observations would indicate that the particle size is a very definite and a given factor that must be considered in such evaluations.

I would also like to ask the question as to whether or not the specific quality of a specific type of graphite enters into the particular wear factor that I mentioned previously? According to one of the slides shown, flake graphite offered a remarkable difference from the standpoint of wear score diameter. Will this be carried out in all operations irrespective of the particular type of metal to metal combinations, design and surface finishes employed and so forth?

E. S. Glauch: Mr. Pritchard refers to the value of graphite in lubricants in such cases where surface defects exist either on the bearings or journals. This definitely is one instance where the value of graphite in lubricants has been proven. The graphite being a solid, fills the defects and any other irregularities in the machined surface providing a smooth surface which can then be more readily lubricated with either oil or grease. Graphite being a solid, once it is forced into the irregularities or surface defects, is not squeezed out by the bearing pressure as would be the case with oil or grease. The graphite also aids lubrication in that it prevents the irregularities from breaking the oil or grease film.

Mr. Pritchard asks what the optimum percentage and type of graphite is that can be used in antifriction bearings. This question cannot be answered by a single statement due to the varied application of such bearings.

We currently are not supplying graphite lubricants for any heavy duty applications involving antifriction bearings in steel mills. There may be applications of this type where others are supplying graphite lubricants but the writer is not familiar with them.

We have supplied graphite lubricants for use in antifriction type bearings in such cases as mine car units, high speed hammer mills and other similar applications. We have supplied lubricants for these applications to some customers for more than twenty-five years. This indicates to the writer satisfactory performance, for surely had they had any difficulty with excess wear on bearings, they would have discontinued the use of the graphite lubricant. For these applications, the lubricant contains 4 per cent of graphite which is ground so that a minimum of 97 per cent will pass a 325 mesh sieve and the graphitic carbon is in the range of 97 per cent.

Mr. Pritchard's reference to the accumulation of graphite deposits would indicate that perhaps the lubricant contained too high a percentage of graphite or the lubricant had been applied too frequently or even possibly that the base lubricant or grease had broken down permitting separation. His statements with reference to rate of wear, also could be caused by several factors. One is the wrong type of lubricant, the lubricant containing too high a percentage of graphite or the quality of the graphite contained in the grease.

Mr. Pritchard also asked the question whether the specific quality, type or size of graphite has relationship to the wear and believe that the figures shown on Table I would definitely indicate that these are factors that must be considered.

D. E. Whitehead: You mentioned that you did not know of any specific large antifriction bearing steel mill application involving the use of a graphitic grease. I can think of one, the 52-in. structural mill at Homestead. This mill is equipped with large antifriction vertical roll bearings, and graphite grease had been used for years.

John F. Boal: Many steel plants have long relied upon graphite lubricants for certain of their specialized applications. Graphited oils are often used to successfully lubricate under high temperature conditions suuch as are encountered in conveyors and cars passing through furnaces, transfer chains handling hot steel and for hot drawing, rolling and forging operations.

A number of different types of greases containing graphite have performed well in the lubrication of certain steel mill equipment. These greases have ranged from the heavy consistency block types widely used for roll neck lubrication on older mills to the softer type greases such as are used in modern centralized systems for delivery of grease to the bearings. Some of the applications where graphited greases are often used in steel plants include plain roll neck bearings, plungers on hydraulic pumps, accumulators and on hot bed skids.

The addition of graphite to certain soft greases seems to help the thin grease film on bearing surfaces resist the washing action of water; also the graphite acts as a parting material and reduces the tendency toward the galling of bearing surfaces under conditions of boundary lubrication. Both these conditions are normally encountered in plain roll neck bearings where water sprays are used for cooling of the roll necks and as a result graphited greases have found fairly wide acceptance for this application.

Mr. Glauch has mentioned that there are several general types of graphite and he has indicated that certain of these types are preferred for use in lubricants. The maximum particle size of the graphite and the amount and character of the non-graphite material present all have a bearing upon the suitability of the graphite for a given grease application.

Some steel plants have experienced cases in which the use of an improper type of graphite in the grease has resulted in the grease exhibiting an abrasive tendency. In one plant in which a graphited grease was being applied to plain roll neck bearings through an automatic centralized system, an excessive amount of wear took place in the closely fitted and hardened pistons and check valves of the lubricant pump, making an early replacement of these pump parts necessary. During the time this grease was being used, however, the quality of the lubrication on the plain roll neck bearings was entirely satisfactory.

This emphasizes the importance of the grease supplier giving due consideration to the selection of the correct grade of graphite for use in greases and particularly those which are to be dispensed through centralized systems. It also points to the need for close control by the manufacturer of the

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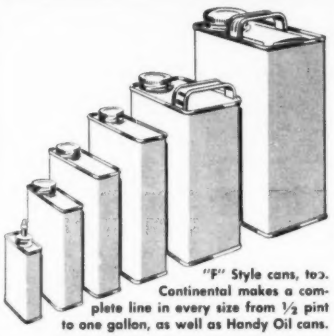

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graphite to insure the quality of the materials being sold for grease applications.

E. S. Glauch: With reference to Mr. Boal's comments that the use of improper type of graphite has resulted in excessive wear on valves and pistons of automatic centralized systems, this can be quite serious.

It has been brought to our attention that at times lubricants have been produced for use in such systems where the grade of graphite was one which we normally would not recommend. We had one such instance several years ago where we were called upon for our recommendations. We were not supplying the grease or the graphite. In that instance, our examination of the grease indicated that the graphite used was of the amorphous type and contained approximately 80 per cent graphitic carbon. The percentage of graphite in the lubricant was probably higher than it should have been for that particular application. It was our recommendation that this particular company have their lubricant supplier produce for them, or supply them, a grease containing a graphite which would pass completely through a 325 mesh screen and have a graphitic carbon content in the range of 95-97 per cent.

The subject of wear on parts of centralized lubricating systems is being investigated, however, it will probably be some time before results of tests are available.

I might mention that about the same time that we were conducting tests, the results of which are reported on Table I, one of the major oil companies was conducting a similar series of tests also using a Timken machine. They, however, used a ball bearing and operated their tests over a longer period of time. The final results of their test and our test checked very closely.

As both tests indicated, natural graphites showed less wear than tests using artificial or manufactured graphite. The oil company results indicated that when they tested the graphites of a manufactured variety, even though the graphitic carbon content was in a range of 99 per cent, the wear was much greater than on any natural graphite of similar graphitic carbon content and was even much greater than the test they ran on amorphous graphite running approximately 80 per cent in graphitic carbon. In their tests, the wear on the balls, when using manufactured graphite, was so great that when the test was completed they did not have to disassemble the bearing to remove the balls for weighing since the balls fell out due to the reduced diameter caused by the excessive wear.

V. A. Crosby: What has been done with molybdenum disulphide in combination with graphite or as an alternate for graphite?

E. S. Glauch: The writer has had no personal experience with molybdenum disulphide either by itself or in combination with graphites. I do know that this material has been used in lubrication with excellent results reported, but have also seen one or two references where results were not outstanding. Undoubtedly this material has certain properties which may make it useful for certain applications but as stated above, I have had no personal experience with its use as a lubricant.

(*Reprinted from Iron and Steel Engineer, August,* 1951)

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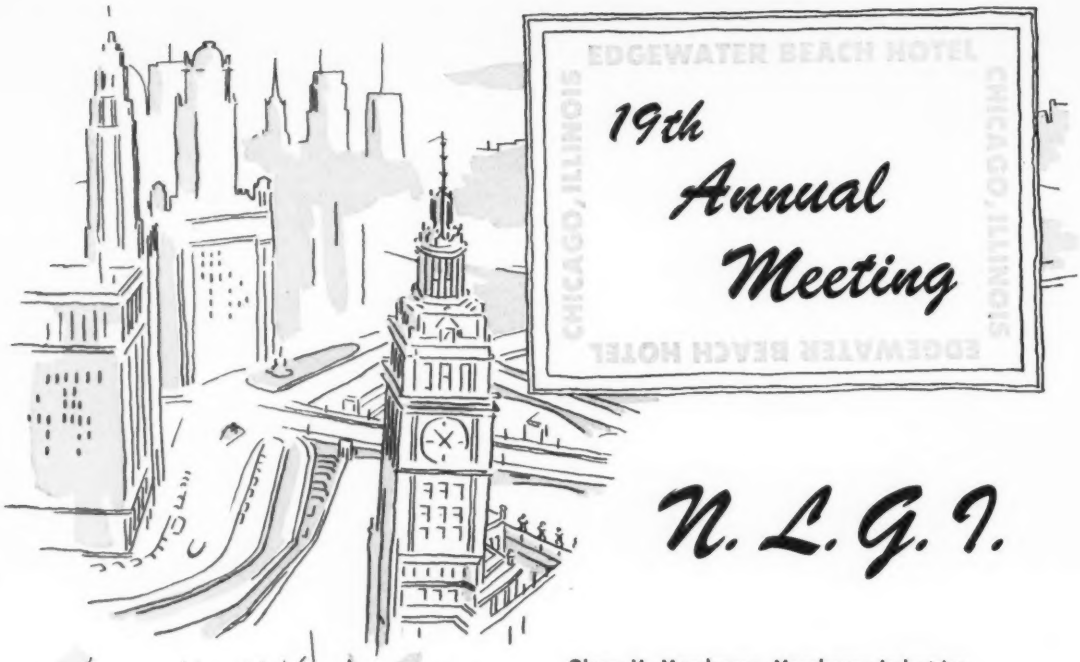


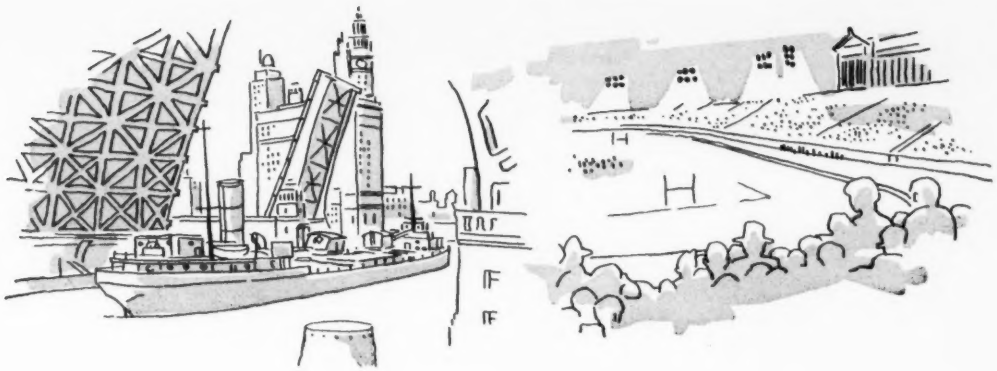
Glenn H. Morehouse, Morehouse Industries
"Grease Milling and Deaeration"

Glenn H. Morehouse was born in Chicago, Illinois, on November 15, 1909, the son of Louis H. Morehouse, whose father, Miles O. Morehouse in 1898 founded the business that carries his name.

Originally the company was engaged in food processing and packing. In order to be nearer sources of supply the plant was transferred to California in 1913. The original mechanical development perfected was a piece of milling equipment that aroused international interest of food processors. That original machine has since been followed by an entire series of mills and today the company manufactures special equipment for processing paints, inks, foods, general chemicals and lubricants.

Upon the death of Louis H. Morehouse in 1942, the responsibility of management passed to his son, Glenn. In the capacity of technical director for his company, he has become widely known for the highly valuable practical counsel and advice he has contributed and the mechanical problems he has solved in many of the largest industries. He has assisted in the design and installation of processing machinery in many of the outstanding food, paint, ink and grease manufacturing plants. Mechanical equipment the world over reflects his abilities in the development and application of highly specialized machinery designed to improve the end product.

Mr. Morehouse is married and has a son now attending college. He is very active in civic and church affairs and as a result of, and concurrently with these activities, has become interested and active in programs directed towards the betterment of the Navajo Indians in Arizona and New Mexico. He is also an ardent enthusiast at hunting and fishing.



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Clifford C. Goehring, Esso Standard Oil Company

"A Sales Engineer Looks at the Steel Industry"

Mr. Goehring is a Senior Sales Engineer for the Esso Standard Oil Company. He holds the degrees of Bachelor of Chemistry and Chemical Engineer from Cornell University, and has been associated with the petroleum industry since 1941. During this period Mr. Goehring has been engaged in both manufacturing and sales activities. Mr. Goehring is an active member of the American Society of Lubrication Engineers and the Association of Iron and Steel Engineers.

D. G. Proudfoot, The Pennzoil Company

"An Analysis of Wheel Bearing Grease Complaints"

Mr. Proudfoot, who is a native Scot, attended Madras College in St. Andrews, Scotland. Upon moving to Canada, he continued his education at McGill University where he obtained the degrees of B.A. and B.Sc. He is a member of the SAE Fuels and Lubricants Committee, The ASTM and API Lubrication Committee, and the Technical Advisory Committee of the Pennsylvania Grade Crude Oil Association. Since 1938 he has been Manager of the Sales Engineering Department of The Pennzoil Company, Oil City, Pa.

G. H. Morehouse

C. C. Goehring

D. G. Proudfoot

R. F. Baker

Richard F. Baker, Department of Chemistry, University of Southern California
Co-Authors: Dr. H. F. Coffer and Dr. Robert D. Vold, Department of Chemistry, University of Southern California.

"The Structure of Gels of Hydrous Calcium Stearate in Cetane. Rheological Studies and Electron Microscopy."

Richard F. Baker, a native of Westfield, Pennsylvania, received his B.S. and M.S. degrees from Pennsylvania State College. A Ph.D. in Physics was earned at the University of Rochester in 1938. Mr. Baker held the position of biophysicist at Columbia and John Hopkins from 1938 to 1941. Following this he became physicist for RCA laboratories until 1947. He then accepted his present position as associate professor of experimental medicine at the University of Southern California. His chief interests are electron optics and the application of the electron microscope to morphological problems in biology and chemistry.

Dr. Vold obtained his B.A. and M.S. degrees from the University of Nebraska and Ph.D. from the University of California at Berkeley where he studied with Professor Hildebrand. After two years as a research chemist with the Procter and Gamble Company in Cincinnati, Ohio, Dr. Vold spent four years at Stanford University as a post-doctoral fellow where he was associated with Professor McBain. He came to the University of Southern California as an Assistant Professor in 1941 and is now Professor of Chemistry and Head of the Department.

R. D. Vold

Dr. Vold is the author of over fifty research papers in the general field of colloid chemistry. These fall largely into four different groups: studies of crystalline and liquid crystalline phases by x-ray diffraction, differential calorimetry, microscopy, rheology, etc.; peptization, suspending power, emulsification, solubilization and ion-exchange in systems of solids or liquids in colloidal dispersion; properties of surface films on solids; structure of gels.

Dr. Coffer received his B.A. and M.S. degrees from the University of Arizona, his studies being interrupted by a four-year period in the U. S. Air Force. Subsequently, he received his Ph.D. from the University of Southern California this year, the title of his dissertation being, Rheological Behaviour and Structure of Calcium Stearate-Cetane Gels. At the very end of his studies, he was given an appointment on the newly established National Lubricating Grease Institute Fellowship at the University of Southern California and has now accepted a position with the Continental Oil Company.

H. H. Hull

Harry H. Hull, R. R. Donnelley & Sons Company

"The Band Type Viscosimeter for Consistency Measurements of High Rates of Shear"

Harry H. Hull is a research engineer on inks and their behavior at R. R. Donnelley & Sons Company of Chicago, Illinois. He received his B.S. degree in Chemical Engineering at Purdue in 1933 where he was a member of Tau Beta Pi. In 1939 he earned his M.S. degree in Physical Chemistry from the University of Chicago.

Mr. Hull began his career in the testing laboratory of The Texas Company, Lockport, Illinois, in 1933. The following year he became chemist and chemical engineer, working with phosphates and detergents for the Victor Chemical Works, Chicago Heights, Illinois. In 1943, he entered service in the U. S. Army until he accepted his present position in 1946.

Mr. Hull, the author of several technical articles, holds membership in the American Chemical Society, the Society of Rheology and the Technical Association of the Graphic Arts.

Dr. Carl W. Kelley, Office of Petroleum Programs

"Military Lubricants: Consolidation and Requirements"

Dr. Kelley, who is at present a member of the Office of Petroleum Programs, Munitions Board, is a graduate of the University of North Carolina and the University of Maryland. His former activities include work as a research associate for Briggs Filter Company and Bureau of Mines, Lt. Commander in the U. S. Navy,

and four years at the U. S. Naval Engineering Experiment Station, Annapolis, Maryland. He has also been a Senior research chemist and staff engineer for the Shell Oil Company. Before accepting his present position, he was connected with the Fuels and Lubricants Section, Ordnance, Department of the Army. Dr. Kelley is a member of ASLE, American Chemical Society, Alpha Chi Sigma and Sigma Xi.

C. W. Kelley

Bruce K. Brown, Petroleum Administration for Defense
Co-Author: C. E. Davis, Petroleum Administration for Defense
"Lubricating Grease for the Machines of Defense"

Bruce K. Brown, deputy administrator of the Petroleum Administration for Defense, was born in Columbus, Ohio, in 1899. He received his B.S. and M.S. at the University of Illinois.

Upon leaving the University of Illinois, he undertook employment as a research chemist. In 1923 he was employed by the Commercial Solvents Corporation as a patent expert and later because its research director also. Six years later, Mr. Brown joined Standard Oil Company (Indiana).

In November 1941, he was called to Washington, D. C., as a special consultant on aviation gasoline. His work on the program resulted in the petroleum industry's construction of 189 aviation gasoline refining units and gave the United States a tremendous output of vitally needed fuel for air war.

Mr. Brown returned to his former position with Standard of Indiana in 1944 and was re-elected a director. In 1945 he was elevated to vice president in charge of development. He was elected president of Pan American Petroleum Corporation, a subsidiary of Standard of Indiana, in 1947, at which time he relinquished direction of the parent company's development activities while continuing as vice president and director of Standard and a member of its research committees.

With the merger in August 1949, of Pan American Petroleum Corporation and Root Petroleum Company, its subsidiary, to form Pan-Am Southern Corporation, Mr. Brown severed his connections as vice president and director of Standard Oil (Indiana) and became president of Pan-Am Southern.

In November 1950, Mr. Brown resigned as president of Pan-Am Southern to become deputy petroleum administrator of the new Petroleum Administration for Defense.

From 1947 until he joined PAD, Mr. Brown was chairman of the Military Petroleum Advisory Board. He has been a member of the National Petroleum Council, the American Petroleum Institute, the Patents Committee of the National Research Council and of various professional societies. He was also formerly a member of the Industry Advisory Group to the Atomic Energy Commission.

Early in his career Mr. Brown found considerable time for writing. He is credited with scores of papers in technical and trade journals, largely on plastics, lacquers, solvents and pigments. He is the author of a book of Nitrocellulose Lacquers. He is also the holder of some 15 patents.

He is a member of the University Club of Chicago, Chemists Club of Chicago, Chemists Club of New York, Cloud Club of New York, American Chemical Society, Society of Chemical Industry, American Bar Association, and Chicago Patent Law Association.

B. K. Brown

C. E. Davis of New York City recently has been appointed Director of the Refining Division of the Petroleum Administration for Defense. Mr. Davis, who will serve in this capacity without compensation, has been vice president of the Shell Oil Company in charge of refining. He joined Shell in 1917 and has worked for that company ever since, holding various technical and executive positions in connection with refining.

A native of Oklahoma, Mr. Davis received his high school education at Cushing, Oklahoma, and attended South Texas Law School.

He has served on committees of both the National Petroleum Council and Military Petroleum Advisory Board. Mr. Davis is also Director of the Coordinating Research Council and Vice Chairman of the General Committee in the Division of Refining of the A.P.I.

C. E. Davis

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J. A. Brown

L. D. Loring, Jr.

C. N. Hudson

John A. Brown, Sinclair Research Laboratories, Inc.
Co-Authors: C. N. Hudson and Lewis D. Loring, Jr., Sinclair Research Laboratories, Inc.
"Electron Microscope Studies of Lithium Greases: Relationship of Soap Structure to Composition: Processing and Properties"

John A. Brown, electron microscopist and physical chemist for Sinclair Research Laboratories, received his education at Loyola University, Chicago, Illinois, where he earned his B.S. degree in Chemistry in 1940 and held membership in Lambda Chi Sigma, an honorary chemical fraternity.

His former employment includes experience as a physical chemist from 1940 to 1942 with International Printing Ink Company, and a radar technician from 1942 to 1946 with the U. S. Army Air Corps.

Mr. Hudson, a native of Springfield, Missouri, spent three years with the U. S. Army during World War II, including fifteen months in the European Theater with the 14th Armored Division. After returning from military service he attended the Missouri School of Mines and Metallurgy at Rolla, Missouri, and was graduated in 1948 with a B.S. in Chemical Engineering. He is a member of Alpha Chi Sigma, Tau Beta Pi, and Phi Kappa Phi professional and scholastic fraternities. During his senior year in college he served as Vice-President, then President of the student chapter of American Institute of Chemical Engineers.

After graduation, Mr. Hudson joined the Research & Development Department of Sinclair Refining Company. In May of this year the Department became Sinclair Research Laboratories, Inc., and at present he is in the Lubricants Division of the latter.

Mr. Loring was graduated from Tufts College, Medford, Massachusetts, in 1941 with a B.S. in Chemical Engineering. After this he spent five years in the Navy as an Ordnance Officer. In 1946 he joined the Research Department of the Sinclair Refining Co. As a member of the Lubricants Division he has been connected with grease research and development since November, 1949.

T. G. Roehner

T. G. Roehner, Director, Socony-Vacuum Laboratories
"Fretting Corrosion"

T. G. Roehner received his Bachelor of Chemistry degree from Cornell University in 1924. He spent six years in Chile, South America, with Braden Copper Company, as Test Engineer and Chemist. In 1930 he joined the Standard Oil Company of New York, and his present position with Socony-Vacuum Oil Co., Inc., is that of Director of the Technical Service Laboratories of Socony-Vacuum Laboratories, Brooklyn, N. Y.

C. R. Singleterry

Dr. Curtis R. Singleterry, Naval Research Laboratory
Co-Authors: V. G. Fitzsimmons and R. L. Merker, Naval Research Laboratory
"Phthalocyomine Lubricating Greases"

Mr. Singleterry, a Colloid Chemist with the Naval Research Laboratory in Washington, D. C., received his B.A. degree from Aurora College, Aurora, Illinois,

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in 1921. An M.S. degree in organic chemistry, received in 1926, was followed by a Ph.D. in Physical Chemistry in 1940. Both degrees were from the University of Chicago. Mr. Singleterry was a professor of chemistry at Aurora College from 1923 until he accepted his present position in 1946. During this time he was also a consultant on paper coating and industrial proteins. He is a member of the American Chemical Society.

Arnold Bondi, Shell Development Company
"Development of Soda Base Greases"

Mr. Arnold Bondi was born in 1916 in Hamburg, Germany, where he also received his education. The late Professor E. L. Lederer, one of the deans of soap chemistry, indoctrinated him into colloid physics. After coming to this country he worked in the fields of textile chemicals, white oil manufacture, and lubricating oil refining. He apprenticed as grease cook with Harold M. Fraser at International Lubricant Corp. in New Orleans from 1944 through 1946 and was transferred to Shell Development Co., Emeryville, California, his present location, in January 1947. Lubricating grease is still one of his charges.

Mr. Bondi is a member of the American Chemical Society, the American Institute of Chemical Engineers, the Society of Rheology, and the American Institute of Physics, and Sigma Xi. He has published numerous papers and, recently, also a book on the Physical Chemistry of Lubricating Oils. The present paper is a summary of work done on anhydrous soda base grease by research groups at International Lubricant Corp. and at Shell Development Co.

A. Bondi

Walter J. Ewbank, Cato Oil and Grease Company
"Why Don't We Teach the Principles of Lubrication to Our Engineering Students?"

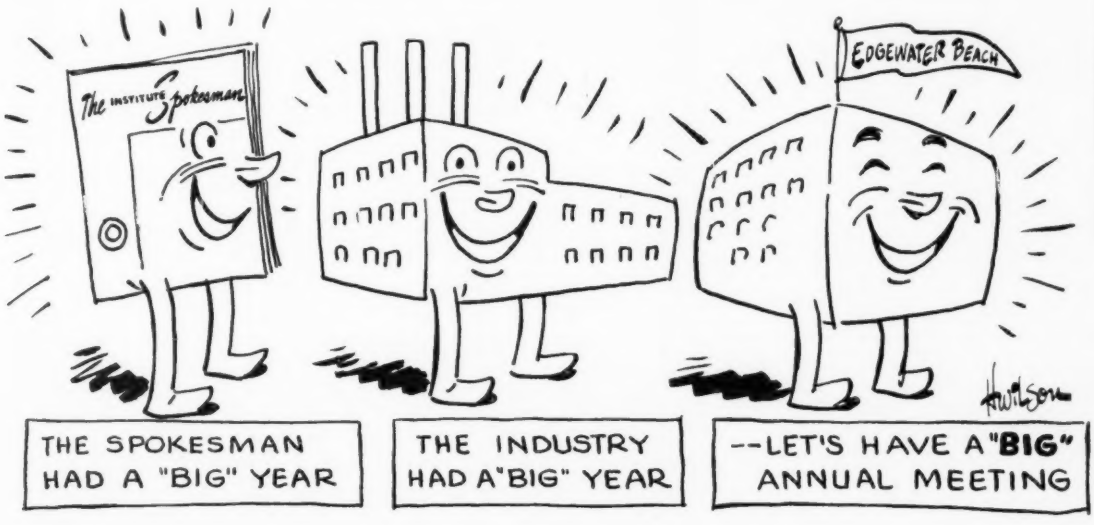
Professor Walter J. Ewbank was born in Lawrenceburg, Indiana, in 1914. He attended the University of Cincinnati, Purdue, and Virginia Polytechnic Institute, receiving a B.S. in Chemical Engineering from Purdue, and his M.S. from V.P.I.

After graduation, he worked for Briggs Filtration Company, from 1938 to 1948. In 1948 he accepted a postion as Assistant Professor of Mechanical Engineering at the University of Oklahoma. In addition to the normal courses in mechanical engineering, Professor Ewbank teaches courses in the use of fuels and lubricants, and directs graduate research in the field of lubrication.

In addition to his duties at the University, Professor Ewbank has, since 1950, acted as consulting engineer to the Cato Oil and Grease Company, and serves as their representative on the N.L.G.I. Technical Committee. His work for Cato is in the field of research and development of lubricants, and petroleum specialties.

Professor Ewbank is a member of SAE, ASME, and ASLE.

W. J. Ewbank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Patents and Developments

SOLVENT RESISTANT GREASES

There has been a demand for greases capable of being used in presence of liquid hydrocarbons and other chemicals which wash out and render ineffective the ordinary type of lubricating grease. This is particularly true in the case of apparatus operating at temperatures as low as —150°F in presence of methyl chloride, for example.

In its U. S. patent 2,563,606, Standard Oil Development Co. proposes the use, for this purpose, of a silica gel treated with a polyhydric alcohol. When the water of an inorganic hydrogel is replaced by a liquid having lubricating properties, but is suitably resistant to solvent attack, and is milled properly, an excellent grease-like structure can be produced. The inorganic gel may be silica, alumina, chromia, titania, zirconia, stannia, ferria, thoria, etc., and the consistency of the finished product depends on the proportion of liquid to solid matter present. About 5% to 20% of solid matter may be incorporated.

If the grease is to resist the action of hydrocarbons or chlorinated hydrocarbons, a combination of gelatinous silica with a glycerol or glycol may be used. However, if resistance is desired to sulfuric acid or liquid chlorine or bromine, a combination of gelatinous silica with sulfuric acid as the liquid medium can be used. Other liquids which may be used as the liquid grease components are phosphoric acid, silicic acids, esters of phosphoric or silicic acids, cresyl phosphate, cresyl orthosilicate, sorbitan monolaurate, nitrobenzene, triethanolamine, silicone polymers, etc. Soaps may be used to replace a part of the gel.

The hydrogel is worked on a steam heated rubber mill with the ethylene glycol (or other liquid), and water is gradually removed by evaporation. A small amount of residual water left in the composition lowers the useful temperature range of the greases. Table I shows the low temperature penetration obtainable with some silica-ethylene glycol-water compositions:

TABLE I

Composition, Wt. %			Penetration, mm.	
SiO_2	$C_2H_4(OH)_2$	H_2O	—11°F	—142°F
10	90	0	125	22
9	57	34		30
9	67	24	320	36

BARIUM BASE GREASES

Ordinarily, barium base greases are not too stable in their common form at temperatures near or above the normal boiling point of water. A recent Socony-Vacuum Oil Co. patent (2,564,561) discloses improved compositions which are claimed to possess high stabilities, at temperatures well above those at which normal barium greases are highly unstable, as measured by the dropping point and B.E.C. grease testing machine tests.

The invention involves incorporating 0.5-5% of monobasic fatty acid having not over 6 carbon atoms, 1-10% of a wax such as candelilla and montan, and sufficient barium hydroxide to react with the acidic constituents. Table II gives the compositions of (1) a conventional barium grease, (2) one containing some additional glycerine and candelilla wax to change texture and consistency, and (3) one made in accordance with the patent:

TABLE II

	Grease No.		
	1	2	3
Stearic acid, %	18	14	14
Candelilla wax, %	....	4	4
Glacial acetic acid, %	....	....	4
Glycerine, %	1	2.5	6.5
$Ba(OH)_2\ 8H_2O$, %	11.2	9	19
Solar Red Oil, %	69.8	70.5	52.5
ASTM Dropping Point, °F	240	235	343
Leakage at 80°F (B.E.C.)	None	None	None
" " 180°F "	5%	10%	Trace
" " 220°F "	Full Cup	Full Cup	5%

As is apparent from the test results shown, the patented grease exhibits a dropping point 100° above those of the other greases, and leakage at even 220° F was small compared to the excessive leakage of the other two samples. Apparently the wax alone does not confer heat stability as does the combination with barium acetate.

NEWS ITEMS

Static friction tests at the Bur. of Standards showed that the lowest values were obtained with compositions containing molybdenum disulfide, followed by a mineral lubricating grease. A lubricant containing an oxidized petroleum compound, and one containing a silicone grease, gave slightly less friction than the reference oil. Higher friction than the reference oil was displayed by chlorinated and fluorinated lubricants without additives. Certain heat treated stainless steel combinations showed lowest friction values with most lubricants. Polished surfaces sliding on lapped surfaces tended to produce lower friction and less variation than ground surfaces sliding on ground surfaces (Steel 5/28/51, p. 102).

Flow properties of aluminum soap gels in Xylene-Cheremisinoff (Amer. Pt. J. 7/9/51, p. 94).

Shell Oil Co. is increasing its output of oil soluble sulfonates by additional facilities (Oil, Pt. & Drug Rep. 7/16/51, p. 49).

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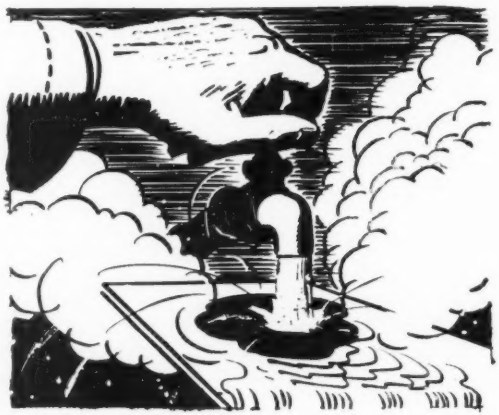

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PEOPLE in Your Industry

J. R. Sabina

SABINA AND BENDER TO REPRESENT DU PONT

E. I. du Pont de Nemours & Company have chosen two well-qualified men to represent their company's membership in the N.L.G.I. J. R. Sabina has assumed the responsibility of representative for the company while R. O. Bender takes his place on the Institute's Technical Committee.

John R. Sabina is Technical Manager of du Pont's Petroleum Chemicals Division. He joined du Pont in 1937 after many years of development work in motor fuels and lubricants. His first job after being graduated from the University of Pennsylvania was with the Baldwin Locomotive Works as a plant engineer. Later he became test engineer, and finally manager of the Automotive Laboratory of the Atlantic Refining Company in Philadelphia. Since joining du Pont he has been active in the development of chemical additives for petroleum products and organized the original Petroleum Laboratory of the Company. He has also been active in the affairs of the American Society for Testing Materials, the Society of Automotive Engineers and the Coordinating Research Council. In 1944 he was elected vice president in charge of Fuels and Lubricants of the S.A.E.

Richard O. Bender is concerned with new product development in the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company. After graduating from Swarthmore College he was employed by the Sinclair Refining Company at their Marcus Hook plant. Prior to assuming his present position he was head of the Chemical Division of the Petroleum Laboratory of the du Pont Company. He has been active in the affairs of the American Society for Testing Materials, the Coordinating Research Council, and the American Chemical Society.

Du Pont's Petroleum Chemicals Division supplies antioxidants to the grease industry as well as tetraethyl lead, gasoline antioxidants, metal deactivators and dyes to the petroleum industry.

R. O. Bender

PERSONNEL NOTES FROM FOOTE MINERAL

Dr. S. C. Ogburn, Jr., Director of Research and Development, is serving on the General Committee for the 1951 Meeting of the American Association for the Advancement of Science and is also on the Sub-committee on Exhibits of the Annual Exposition of Science and Industry. Members of this national group will meet in Philadelphia in December. Dr. Ogburn is also serving on the committee of Professional Relations in the local section of the American Chemical Society.

Felix Litton, Metallurgical Engineer on Foote's Research and Development Staff, will present his paper on "Preparation and Some Properties of High Purity Zirconium Metal" at the 12th International Congress of Pure and Allied Chemistry in New York in September.

Larry Zerone, Chemical Engineering graduate from Villanova College, and Howard Daly who recently took his M.S. in Chemistry at the University of New Hampshire have both joined Foote's Research and Development Staff.

HARDESTY NAMES HARMON

Wm. S. Harmon has joined the staff of Hardesty & Co., 60 East 42nd Street, New York 17, N. Y., as Technical Director with headquarters in the Philadelphia plant, 3512 Cedar Street, Philadelphia 34, Pa. Previous to his new position, Mr. Harmon spent several years in the Engineering and Research Departments of Merck & Co., Inc. This latest addition in personnel is in keeping with the company's policy of further improving the quality of Stearic Acid, Red Oil, Hydrogenated Animal and Hydrogenated Fish Oil Fatty Acid, etc. Also the research and development of new products under expansion plans of Hardesty & Co. will be under Mr. Harmon's direction. During the past few years Mr. Hardesty has been building up a staff of young, experienced, aggressive personnel in order that the production of his new expanded plants can be properly distributed to consuming channels according to industry requirements.

W. S. Harmon

DOW CORNING

Silicone Notes

ON LUBRICATION

REFERENCE NO. SL-52

FILE SILICONE LUBRICANTS

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DOW CORNING CORPORATION
Midland, Michigan

DOW CORNING 200 FLUID

Dow Corning 200 Fluid has been tested at various temperatures in contact with oxygen under a pressure of 2000 psi. Presence of silicon dioxide was taken as evidence of oxidation. After 1 hour at 300° F. and after one-half hour at 390° F. there was no evidence of oxidation.

In actual practice, that kind of oxidation resistance is illustrated by the experience of the Breese Burners, Inc., of Santa Fe, New Mexico who manufacture the Drafbooster, a forced-air fan for oil-fired furnaces.

Back in 1940, Breese engineers installed a Drafbooster in a heater designed for use in their own offices. All went well the first season, but by the following season it was noted that the petroleum oil lubricating the fan motor's porous bronze bearings had thickened. The fan refused to run at normal speed; insufficient air was provided for complete combustion. By mid-winter, the Drafbooster had to be replaced.

The same thing happened with the next Drafbooster, and the next, and the next. Then, in November of 1945, they installed a unit lubricated with Dow Corning 200 Fluid. This Drafbooster has been in operation 6 years without replacement, relubrication or cleaning.

Breese engineers recently inspected their office unit and reported only negligible bearing wear. The silicone fluid has not thickened and is still crystal-clear. Dow Corning 200 Fluid satisfies their requirements so completely, they say, that if this silicone fluid suddenly became unavailable, they'd stop making Drafboosters.

DOW CORNING 550 SILICONE OIL

Dow Corning 550 is notable even among silicone fluids for its exceptional heat stability. Stability and oxidation resistance are demonstrated by the fact that it does not gel or decompose to form gums even after heating at 482° F. for 1000 hours in contact with air.

To Flash-O-Graph Corporation, of Long Island City, New York, that kind of oxidation resistance means an annual saving of thousands of dollars in maintenance and repair costs.

The Flash-O-Graph is an animated advertising sign for store windows and counters. The advertiser's message is punched in a black ribbon belt which is driven across the front of a fluorescent lamp by a phonograph-type motor. It is estimated that the belt revolves 31 million times a year.

For appearance's sake, the sign is almost totally enclosed. As a result, considerable heat develops and failure of the motor's sintered-bronze bearings is common. Once, in fact, an entire order of 1000 signs was replaced less than a week after shipment because of bearing failures.

Then, 16 months ago, Flash-O-Graph ran comparative tests between six signs lubricated with the highest grade petroleum oils and six with Dow Corning 550 silicone oil. The best of the petroleum lubricated group lasted only 20 days without relubrication. All six of the silicone lubricated group are still running . . . without relubrication.

About a year ago Flash-O-Graph standardized on Dow Corning 550 silicone oil for the bearings of sign motors. They estimate their service problem has been reduced 99%. Of thousands of silicone lubricated units since put into the field, not one has been returned because of bearing failure.

DOW CORNING CORPORATION • MIDLAND, MICHIGAN

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CANADA: Fiberglas Canada Ltd., 1200 Bay Street, Toronto, Ontario ENGLAND: Midland Silicones Ltd., 49 Park Lane, London, W. 1

J. H. Westbrook

WESTBROOK PROMOTED

James H. Westbrook has been promoted to manager of the newly created Eastern sales district of Deep Rock Oil Corporation with offices in the Home Bank Building Annex, Milwaukee.

In his new capacity, Westbrook will be in charge of all Deep Rock jobbing sales in the Eastern district, which consists of Illinois, southern and eastern Wisconsin, northwestern Indiana, and the Michigan peninsula.

The new sales manager joined Deep Rock in 1948 as manager of personnel and industrial relations in the Tulsa home office.

FOOTE MINERAL APPOINTS NEW VICE PRESIDENTS

H. C. Meyer, President of Foote Mineral Company, announced the appointment of an executive vice president and three new vice presidents at the conclusion of Foote's semi-annual employee stockholders' meeting held August 23rd at the Exton Plant.

Gordon H. Chambers, former Vice President and Treasurer, was named Executive Vice President. Now rounding out 23 years with Foote, Chambers joined the company in 1928 as a Sales Engineer. Several years later he became Secretary and subsequently was made a vice president in 1936. Writer of many technical articles, Chembers co-authored two well known reference books, WELDING HANDBOOK and INDUSTRIAL MINERALS.

S. C. Ogburn, Jr., Foote's new Vice President in Charge of Research and Development, received his Doctor's degree from the University of North Carolina in 1926. He spent many years in university teaching, administration and research. Prior to joining Foote as Manager of Research and Development, Dr. Ogburn was associated with the Pennsylvania Salt Manufacturing Company and the General Chemical Company.

L. G. Bliss, now Vice President in Charge of Sales, has been Foote's Director of Sales and Distribution for the past sixteen years. In addition to his sales activities, Bliss has served as Assistant Secretary for many years.

Felix B. Shay, Foote's Production Superintendent for the last eleven years, was appointed Vice President in Charge of Production. Shay's international background in mining and production qualify him as a top notch manager for Foote's production operations at Exton, Pa. and Kings Mountain, N. C.

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W. J. Schroeder

DEEP ROCK CHOOSES MILWAUKEE DISTRIBUTOR

In keeping with its policy of withdrawing from all direct marketing operations in favor of independent jobbers, Deep Rock Oil Corporation has announced that its marketing properties and equipment in Milwaukee area have been sold to Walter J. Schroeder, who will operate as the Schroeder Oil Company, an exclusive distributor of Deep Rock products in the Milwaukee area.

Schroeder, an employee of Deep Rock for 27 years, has been manager of the Wisconsin sales area for the past 14 years. He joined the company in Milwaukee in 1924 as a salesman for the Wisconsin area, and rose rapidly through the sales organization.

NEW VICE PRESIDENTS FOR CONTINENTAL CAN

Continental Can Company's board of directors has elected Lawrence Wilkinson and E. R. Van Meter as new vice presidents, Lucius D. Clay, chairman of the board, has announced.

Mr. Wilkinson has resigned his position as director of the New York Civil Defense Commission to accept the Continental Can Company post. As a vice president, he will be assistant to the chairman of the board. He had been appointed State Director of Civil Defense in July of 1950 and in December, 1950, was also named acting chairman of the civil defense commission, becoming chairman in May of this year.

(*Continued on Page* 31)

Lincoln

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A colonel in the U. S. Army during World War II, Mr. Wilkinson served in both a military and civilian capacity as economics advisor to the Military Governor of Germany and had been in charge of planning of ordnance supplies and troops for the Normandy invasion. Before the war he had been a vice president of Marine Midland Trust Company. He was with Dillon Read & Co. in the foreign banking field after leaving his Berlin post in 1949.

Mr. Van Meter has been general manager of the company's Paper Container Division since August, 1950, and will now be vice president in charge of the division. He has been associated with Continental since 1944 and was sales manager of the paper container section before becoming general manager.

Prior to service with Continental, he was administrator of the containers branch of the War Production Board in Washington, D. C., and for fifteen years before that was associated with the Sealright Company, Inc. of Fulton, N. Y.

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PORTUGUESE FIRM JOINS N.L.G.I.

Sociedade Nacional de Petroleos of Lisbon, Portugal is N.L.G.I.'s latest addition to the technical membership. The company was founded in 1933 by a Portuguese group and a French organization, Omnium Francais de Petroles. Both present Administrators, Mr. Manuel Cordo Boullosa and Mr. Manuel Queiroz Pereira, were mainly responsible for the development and greater expansion of the company.

In 1948 SONAP started importing lubricants in bulk in order to establish their own brands of SONAP MOTOR OILS—Premium Grade—in the local market. At the same time the manufacture of greases, which they had started during the war, was increased. Although their greases have been limited to the local market thus far, the company is considering placing their products on the Portuguese Overseas Markets as well which would take advantage of their Bulk Terminal. The company maintains a group of 63 tank-cars to deliver their products throughout Portugal.

M. Boullosa

Mr. Manuel Cordo Boullosa, co-Chairman of the Sociedade Nacional de Petroleos, will be the company representative for the N.L.G.I. Mr. Boullosa, a self-made man of 45, also supervises the company's Lubricants Department. He is assisted in this by Dr. Antonio Bacelar Carrelhas, who has been named as representative on N.L.G.I.'s Technical Committee.

Mr. Carrelhas, who was formerly a Naval Aviation Officer, is a graduate in chemistry. In 1947 he came to the United States where he received training work with the Standard Oil Company of New Jersey and L. Sonneborn & Sons, Inc. Mr. Carrelhas is a member of the Society of Automotive Engineers.

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FUTURE MEETINGS of Your Industry

OCTOBER, 1951

8-9 Texas Mid-Continent Oil & Gas Assn. (annual meeting), Hotel Beaumont, Beaumont, Texas.

8-10 The American Oil Chemists' Socy. (fall meeting), Edgewater Beach Hotel, Chicago, Ill.

8-12 National Safety Council (39th national safety congress and exposition), Stevens Hotel, Chicago, Ill.

13-14 Indiana Independent Petroleum Assn. (fall convention), Hotel Severin, Indianapolis, Ind.

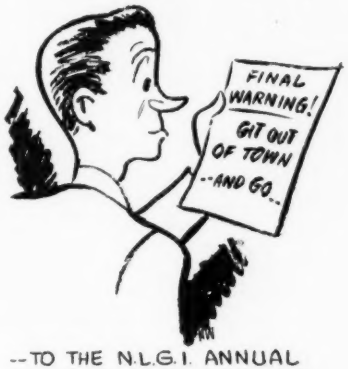
14-20 Oil Progress Week.

22-23 Independent Petroleum Assn. of America (annual meeting), The Shamrock, Houston, Texas.

22-24 American Standards Assn. (33rd annual meeting and national standardization conference), Waldorf-Astoria, New York, N. Y.

29-30 Socy. of Automotive Engineers, Inc. (national diesel engine meeting), The Drake, Chicago, Ill.

29-31 Socy. of Automotive Engineers, Inc. (national transportation meeting), Knickerbocker Hotel, Chicago, Ill.



--TO THE N.L.G.I. ANNUAL MEETING, OF COURSE!

29-31 N.L.G.I. (annual meeting), Edgewater Beach Hotel, Chicago, Ill.

31 to Nov. 1 Socy. of Automotive Engineers, Inc. (national fuels and lubricants meeting), The Drake, Chicago, Ill.

NOVEMBER, 1951

3-8 Oil Industry Information Committee, Stevens Hotel, Chicago, Ill.

5-8 American Petroleum Institute (31st annual meeting), Palmer House, Chicago, Ill.

5-8 A. P. I. Lubrication Committee, Chicago, Illinois.

25-30 The American Society of Mechanical Engineers (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

26 to Dec. 1 23rd Exposition of Chemical Industries, Grand Central Palace, New York, N. Y.

DECEMBER, 1951

2-5 American Inst. of Chemical Engineers (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

3-4 Chemical Specialties Mfrs. Assn. (38th annual meeting), The Mayflower, Washington, D. C.

26-31 American Assn. for the Advancement of Science (annual meeting), The Bellevue-Stratford, Philadelphia, Pa.

★

JANUARY, 1952

14-18 Socy. of Automotive Engineers, Inc. (annual meeting), Hotel Book-Cadillac, Detroit, Mich.

FEBRUARY, 1952

4-6 Missouri Petroleum Assn. (annual convention and trade exhibit), Jefferson Hotel, St. Louis, Mo.

19-21 Iowa Independent Oil Jobbers Assn. (annual convention), Fort Des Moines, Des Moines, Iowa.

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FUTURE MEETINGS of Your Industry

MARCH, 1952

3-5 Mfrs. Standardization Socy. of Valve & Fittings Industry(annual meeting), Hotel Commodore, New York, N. Y.

12-13 Texas Oil Jobbers Assn., Inc. (annual spring convention and refiners & suppliers exhibit), Hotel Adolphus, Dallas, Texas.

11-14 National Assn. of Corrosion Engineers (annual conference and exhibition), Municipal Pier and Galvez Hotel, Galveston, Texas.

APRIL, 1952

7-9 American Society of Lubrication Engineers (7th annual meeting and lubrication show), Hotel Statler, Cleveland, Ohio.

JUNE, 1952

9-10 Chemical Specialties Mfrs. Assn. (38th mid-year meeting), Hotel Statler, Detroit, Mich.

23-27 American Socy. for Testing Materials (annual meeting), Hotel Statler, New York, N. Y.

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OCTOBER, 1952

20-24 National Safety Council (40th national safety congress and exposition), Stevens Hotel, Chicago, Ill.

NOVEMBER, 1952

10-13 American Petroleum Institute (32nd annual meeting), Stevens Hotel and Palmer House, Chicago, Ill.

30 to Dec. 5 American Socy. of Mechanical Engineers, New York, N. Y.

DECEMBER, 1952

1-6 20th National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York, N. Y.

8-9 Chemical Specialties Mfrs. Assn. (39th annual meeting), Hotel New Yorker, New York, N. Y.

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Your Industry NEWS

A.S.L.E. HOLDS M.I.T. SEMINAR

Last June The American Society of Lubrication Engineers added another "first" to their continually mounting contributions to the lubrication profession. They held a seminar at the Massachusetts Institute of Technology under the direction of the well-known professor, J. T. Burwell.

Held from June 11 through the 27th and aimed primarily at the user of lubricants, it included a number of practical subjects designed for the lubrication engineer. Its popularity was expressed in the admittance of less than 50% of the applicants due to class limitations. 50 of the 64 students represented industry, the balance came from research and development fields.

Of particular interest to N.L.G.I. members was the lecture "Greases—Their Characteristics and Applications" given by former Institute Secretary, George W. Miller, now President of the Battenfeld Grease & Oil Corporation of North Tonawanda, New York.

The A.S.L.E. is to be congratulated for both the success of their course and vision in introducing it. Present plans would indicate a continuation and increasing popularity of this contribution to the lubrication engineering profession.

CHEK-CHART EDITS NEW TRUCK LUBRICATION GUIDE

Proper lubrication data to help cut maintenance costs of America's essential trucks is now available in the new Third Edition Truck Lubrication Guide, just published by THE CHEK-CHART CORPORATION, 31 East Congress Street, Chicago 5, Ill.

The 96-page volume contains complete, up-to-date, factory-approved lubrication data for all truck models produced by the 19 truck manufacturers. Both light and heavy duty trucks of the last 10 years are covered, plus many of the older but still popular models.

Included in the 84 pages of lubrication charts are 10 diagrams of popular axle units, one composite chart on trailers, and one on semi-trailers. Six pages of General Instructions give detailed truck lubrication procedures to form the basis of PM (Preventive Maintenance) lubrication service. Also included is a full page of instructions for lubricating truck cabs, complete with composite charts for both conventional and cab-over-engine styles.

An outstanding feature of the Truck Lubrication Guide is the group of 14 tabular-style charts, showing manufacturers' recommendations for the many optional combinations of engine, transmission, and differential used on the larger trucks. For example, one such chart contains lubrication data for 99 different models!

The 7-by-9-inch book is spiral-bound at the left side for convenient use. Data is presented in chart and diagram form.

"MAN ON THE LAND"

New York — The dramatic story of how man has been able to wrest today's high standard of living from Nature and the Land is the theme of a new motion picture sponsored by Oil Industry Information Committee.

Entitled "Man on the Land," the action-packed motion picture was made for the Committee by United Productions of America—the firm which won an Academy Award in 1950 for an animated motion picture. The same style of animation and full technicolor is used in "Man on the Land."

This unusual film tells the story of agriculture in 16 swiftly-paced minutes—from the time that man first scratched the earth with a forked stick to the present age of oil-powered tractors, petroleum fertilizers, insecticides and other petrochemicals.

It illustrates graphically how every one of the nation's 150 million people benefits in one way or another from the side by side progress and the inseparable relationship of two of America's great industries—agriculture and petroleum. A ballad singer carries the story instead of the conventional narration.

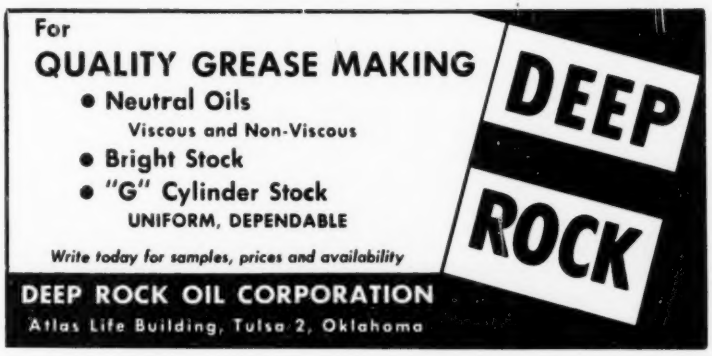
The new motion picture is now being made available to oil companies, trade associations, agriculture societies and organizations, and other interested parties. It is available in both 35 millimeter and 16 millimeter prints. The film is expected to receive thousands of showings from coast to coast, particularly during the period of October 14-20, when the industry observes Oil Progress Week.

Production of the motion picture was supervised by Film Counselors, Inc., of New York, and a subcommittee of the Oil Industry Information Committee headed by Philip C. Humphrey, public relations director for The Texas Company, New York.

EMERY TO PARTICIPATE IN CHEMICAL INDUSTRIES EXPOSITION

Emery Industries, Inc., announces its participation in the 23rd Exposition of Chemical Industries, Grand Central Palace, New York, November 26 through December 1, 1951. The company will occupy Booth Number 283 where many of their products, including some new developments, will be exhibited.

One feature will be a push button panel of end uses which will light up the Emery products applicable to any specific end use. Other features will be attractive bar charts illustrating the superior stability of the Emersol Stearic and Oleic Acids. Samples of all standard sales products and development products will be displayed.



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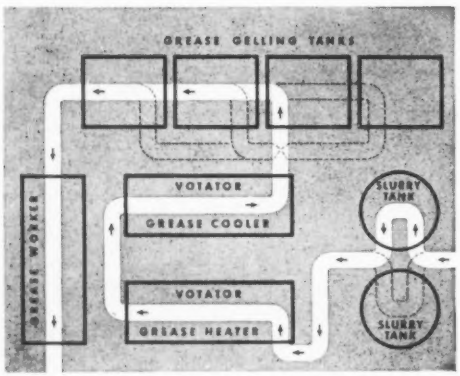

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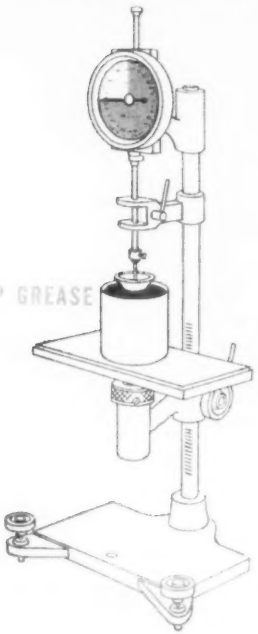

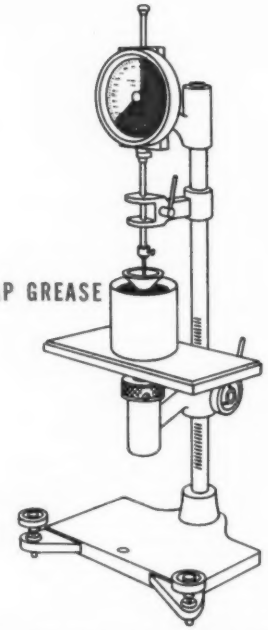

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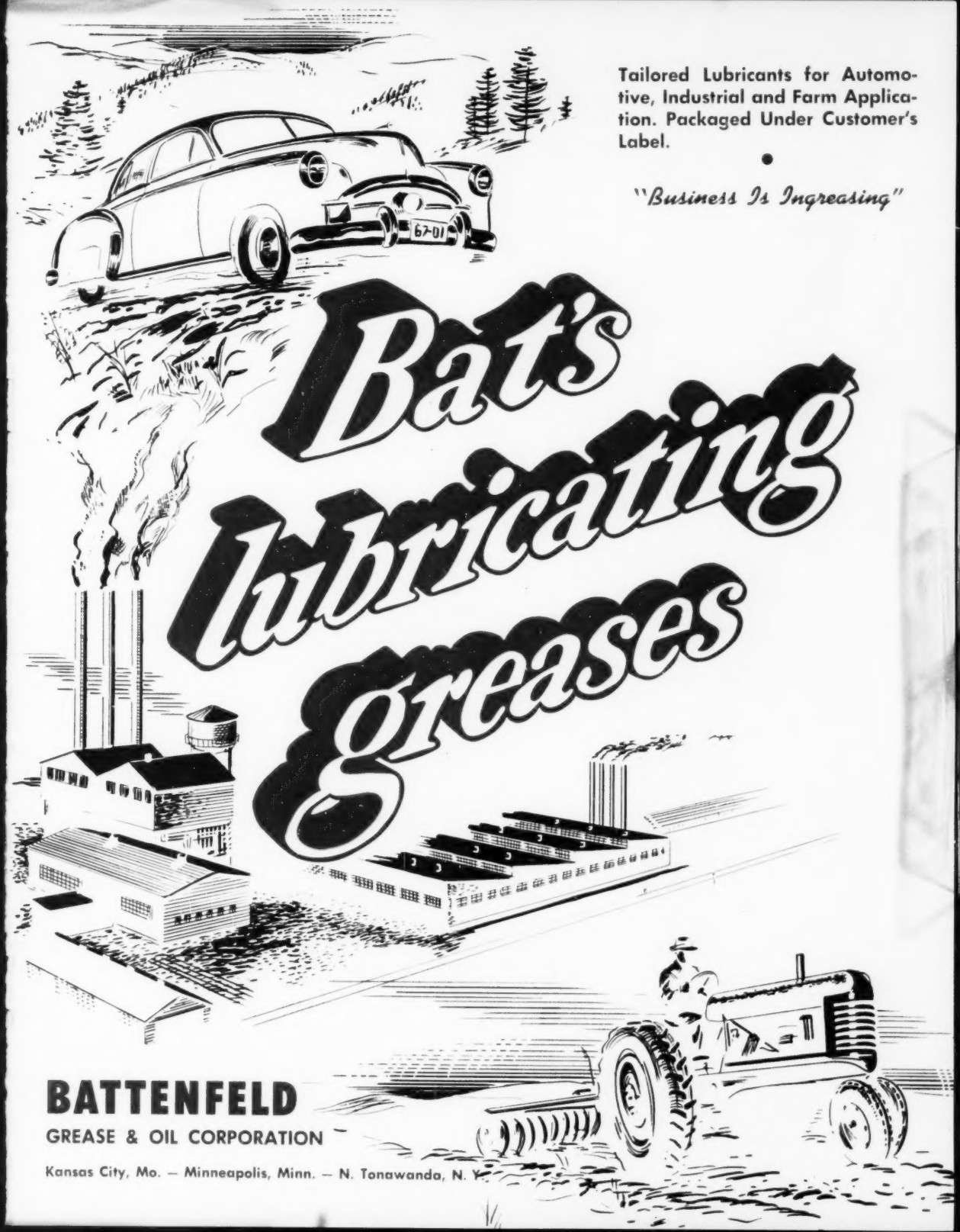
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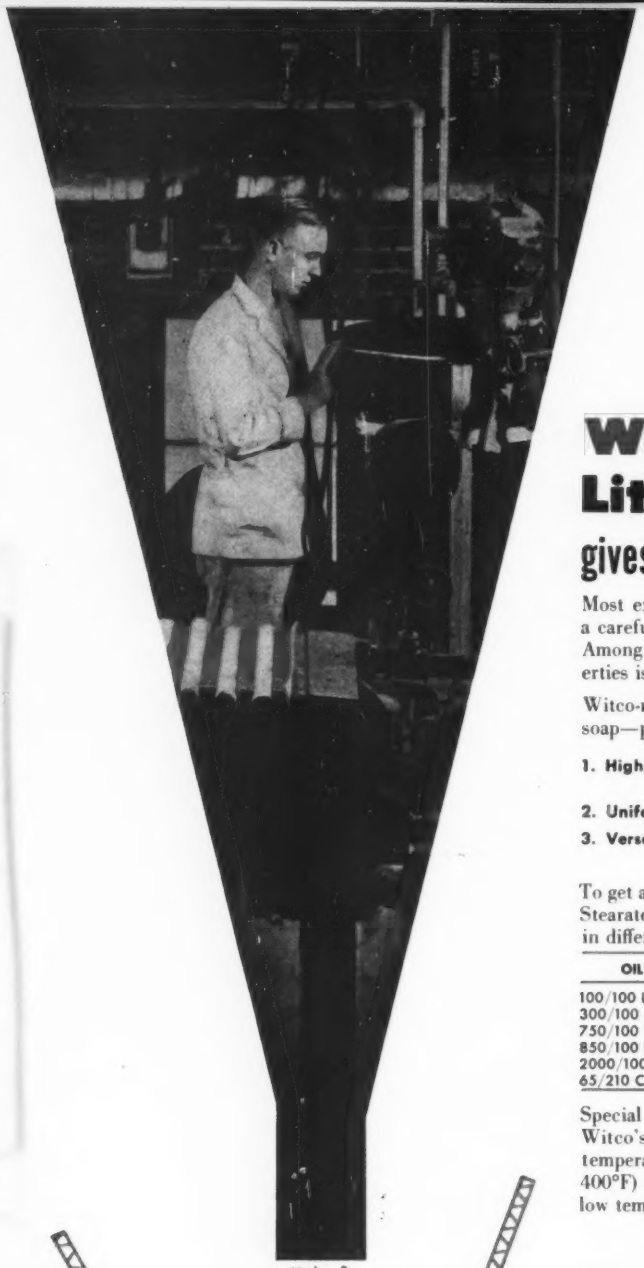

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OIL TYPE	% SOAP	60	1,000	5,000
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300/100 Med V. I.	6	305	345	370
750/100 Texas Pale	6	310	350	375
850/100 High V. I.	6	305	340	375
2000/100 Texas	8	315	330	345
65/210 Coastal	10	240	295	335

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